ABSTRACT

The invention provides a method and apparatus for predicting the failure of a component using a probabilistic model of a material's microstructural-based response to fatigue. The method predicts the component failure by a computer simulation of multiple

5 incarnations of real material behavior, or virtual prototyping. The virtual prototyping simulates the effects of characteristics that include grain size, grain orientation, micro-applied stress and micro-yield strength that are difficult to simulate with real specimens. The invention provides an apparatus for predicting the response of a component to fatigue using the method.

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